

IN THE CLAIMS:

Rewrite the pending claims and add new claims as follows:

- 1-5. (Withdrawn)
6. (Original) A circuit comprising:
 - a push-pull output driver having an output driver current path comprising a NMOS drive transistor and a PMOS drive transistor connected between a voltage source and ground, and also having an output driver reference element;
 - a process detector having a process detector reference element and providing at least one control signal defining a switching signal for the push-pull output driver;
 - a feedback circuit indicating current shoot-through occurring in the push-pull output driver and providing a feedback control signal; and,
 - a control circuit receiving the at least one control signal and modifying the switching signal in response to the feedback control signal;wherein the output driver reference element and the process detector element respond similarly to variations in fabrication processes for the circuit, as well as operating temperature and operating voltage.
7. (Original) The circuit of claim 6, wherein the process detector comprises a delay lock loop (DLL) and the at least one control signal comprises digital codes derived from the DLL.
8. (Original) The circuit of claim 7 further comprising:
 - an adjustment circuit receiving the digital control codes;
 - separate P and N data registers respectively storing P control codes and N control codes; a first digital to analog (D/A) converter receiving the P control codes and generating an analog P bias signal;
 - a second D/A converter receiving the N control codes and generating an analog N bias signal; and,
 - a pre-driver circuit comprising a NMOS pre-driver transistor receiving the N bias signal and a CMOS pre-driver transistor receiving the P bias signal.
9. (Original) The circuit of claim 7, wherein the feedback circuit comprises:

a mirrored output driver current path comprising a NMOS mirror transistor and a PMOS mirror transistor;

resistors converting a current output from the NMOS mirror transistor into an N feedback voltage and a current output from the PMOS mirror transistor into a P feedback voltage;

a XOR gate receiving the N feedback voltage and the P feedback voltage and generating a shoot-through flag when shoot-through is indicated in the mirrored output driver current path.

10. (Original) The circuit of claim 9, wherein the control circuit comprises:

latch circuits capturing shoot-through flags from the XOR gate and providing a pumpup signal to control logic storing a copy of the digital control codes;

wherein the control logic defining a shoot-through detection cycle and resetting the latch circuits following each shoot-through detection cycle.

11. (Currently Amended) A method of ~~defining~~ improving performance in a push-pull driver circuit having an output driver current path comprising a first output transistor and a second output transistor connected between a voltage source and ground, the method comprising:

defining a sequence of transmission switching signals for the first and second output transistors, the sequence of transmission switching signals including a first signal and a plurality of subsequent signals;

detecting, in response to the first signal, shoot-through in the output driver current path;

generating a feedback signal in response to a detection of shoot-through in the output driver current path; and,

modifying the ~~transmission switching signal~~ plurality of subsequent signals in response to the feedback signal.

12. (Original) The method of claim 11, wherein the transmission switching signal comprises a first switching signal applied to the first output transistor and a second switching signal applied to the second output transistor.

13. (Original) The method of claim 12, wherein the step of modifying the transmission switching signal comprises adjusting the duty cycle of at least one of the first and second switching signals.

14. (Currently Amended) ~~The method of claim 12,~~ A method of improving performance in a push-pull driver circuit having an output driver current path comprising a first output transistor and a second output transistor connected between a voltage source and ground, the method comprising:

defining a transmission switching signal for the first and second output transistors;

detecting shoot-through in the output driver current path;

generating a feedback signal in response to a detection of shoot-through in the output driver current path; and,

modifying the transmission switching signal in response to the feedback signal;

wherein the transmission switching signal comprises a first switching signal applied to the first output transistor and a second switching signal applied to the second output transistor; and

wherein the step of modifying the transmission switching signal comprises adjusting ~~modifying~~ a delay between the first and second switching signals.

15. (Currently Amended) ~~The method of claim 1,~~ A method of improving performance in a push-pull driver circuit having an output driver current path comprising a first output transistor and a second output transistor connected between a voltage source and ground, the method comprising:

defining a transmission switching signal for the first and second output transistors;

detecting shoot-through in the output driver current path;

generating a feedback signal in response to a detection of shoot-through in the output driver current path; and,

modifying the transmission switching signal in response to the feedback signal;

wherein the push-pull driver further comprises a driver mirror current path arranged in parallel with the output driver current path, ~~the driver mirror current path comprising a first mirror transistor sized in relation to the first output transistor and a second mirror transistor sized in relation to the second output transistor,~~ and wherein the step of detecting shoot-through in the output driver current path comprises:

detecting mirrored shoot-through current in the driver mirror current path.

16. (Original) The method of claim 15, further comprising:
converting the mirrored shoot-through current into a shoot-through detection voltage,
wherein the feedback signal is derived from the shoot-through detection voltage.
17. (Original) The method of claim 16, wherein the step of defining a transmission
switching signal for the first and second output transistors comprises; defining control codes
in a process detector having at least one process detector reference element, wherein the
control codes determine the transmission switching signal for the first and second output
transistors;
wherein the step of modifying the transmission switching signal in response to the
feedback signal comprises; incrementing the control codes in response to the feedback signal;
and
wherein at least one of the first and second output transistors comprises an output
driver reference element that tracks performance of the process detector element over a range
of variations in fabrication process, operating temperature, and operating voltage.
- 18-19. (Withdrawn)
20. (Currently Amended) A method of ~~defining~~ improving performance in a push-pull
driver comprising a first output transistor and a second output transistor and an output driver
current path between the first and second output transistors, the method comprising:
defining digital control codes in relation to a process detector, wherein the process
detector exhibits performance characteristics which track the performance characteristics of
the first and second output transistors;
defining a transmission switching signal for at least one of the first and second output
transistors in relation to the digital control codes;
detecting shoot-through in the output driver current path;
generating a feedback signal in response to a detection of shoot-through in the driver
current path;
modifying the digital control codes in response to the feedback signal.
21. (Original) The method of claim 20, wherein the process detector comprises a Delay
Lock Loop circuit having performance characteristics that track the performance

characteristics of the first and second output transistors in relation to at least one of process, voltage, and temperature.

22. (Original) A method of controlling shoot-through current in a push-pull driver circuit, comprising:

- defining a transmission switching signal for the push-pull driver circuit in relation to a control signal received from a process detector;

- adjusting the control signal and thereby modifying the transmission switching signal until a shoot-through crossover point is determined at which no shoot-through current occurs in the push-pull driver circuit;

- upon determining the shoot-through crossover point, periodically dithering the control signal to re-introduce shoot-through current;

- following re-introduction of shoot-through current, adjusting the control signal and thereby modifying the transmission switching signal until a new shoot-through crossover point is determined at which no shoot-through current occurs in the push-pull driver circuit.